CLAIMS

[1] A probe device suitable for use in conducting electrical inspection of a great number of integrated circuits formed on a wafer, which comprises:

a circuit board for inspection having a great number of inspection electrodes on a front surface thereof;

a probe card having a circuit board for connection, on the back surface of which a plurality of terminal electrodes have been formed in accordance with a pattern corresponding to a pattern of the inspection electrodes of the circuit board for inspection, and a contact member, which is provided on a front surface of the circuit board for connection, and on which a great number of contacts brought into contact with respective electrodes to be inspected of the integrated circuits on the wafer, which is an object of inspection, are arranged, in which the respective terminal electrodes of the circuit board for connection are arranged so as to be opposed to the inspection electrodes of the circuit board for inspection;

an anisotropically conductive connector, which is arranged between the circuit board for inspection and the circuit board for connection in the probe card, and electrically connects the respective inspection electrodes to the respective terminal

electrodes by being pinched by the circuit board for inspection and the circuit board for connection; and

a parallelism adjusting mechanism for adjusting a parallelism of the circuit board for inspection to the wafer and a parallelism of the circuit board for connection to the wafer,

wherein the parallelism adjusting mechanism is equipped with a location-varying mechanism, which relatively displaces the circuit board for inspection or the circuit board for connection in a thickness-wise direction of the anisotropically conductive connector.

[2] The probe device according to claim 1, wherein the parallelism adjusting mechanism is equipped with a plurality of location-varying mechanisms, and each of the location-varying mechanisms is so constructed that the quantity of displacement of the circuit board for inspection or the circuit board for connection can be set independently of each other.

[3] The probe device according to claim 1 or 2, wherein spacers for regulating the deformation quantity of the anisotropically conductive connector are provided between the circuit board for inspection and the circuit board for connection in the probe card.

[4] The probe device according to claim 3, wherein the overall thickness of the spacer is at least 50%

of the overall thickness of the anisotropically conductive connector.

[5] The probe device according to claim 3, wherein the anisotropically conductive connector is composed of a frame plate, in which a plurality of anisotropically conductive film-arranging holes each extending in a thickness-wise direction of the frame plate have been formed corresponding to electrode regions, in which electrodes intended to be connected in the circuit board for connection and the circuit board for inspection have been arranged, and a plurality of elastic anisotropically conductive films arranged in the respective anisotropically conductive film-arranging holes in this frame plate and each supported by the peripheral edge of the anisotropically conductive film-arranging hole, and wherein

the spacers are arranged on both sides of the frame plate in the anisotropically conductive connector, and the spacers are each in the form of a frame, in which openings are formed in regions corresponding to the regions where the elastic anisotropically conductive films in the anisotropically conductive connector have been formed, and have finely projected portions each composed of an elastic member on at least contact surfaces with the circuit board for inspection and contact surfaces

with the circuit board for connection.

[6] The probe device according to claim 5, wherein the total thickness of the thickness of the spacers including the finely projected portions and the thickness of the frame plate in the anisotropically conductive connector is at least 90% of the overall thickness of the anisotropically conductive connector.

[7] The probe device according to any one of claims 1 to 6, wherein the contact member making up the probe card is formed by that equipped with an anisotropically conductive sheet, in which a plurality of conductive parts for connection each extending in a thickness-wise direction of the sheet are insulated from each other by an insulating part.

[8] The probe device according to claim 7, wherein the contact member making up the probe card is constructed by an anisotropically conductive sheet, in which a plurality of conductive parts for connection each extending in a thickness-wise direction of the sheet are insulated from each other by an insulating part, or an anisotropically conductive connector, in which the anisotropically conductive sheet is supported by a frame plate, and

a sheet-like connector composed of an insulating sheet arranged on a front surface of the anisotropically conductive sheet or the anisotropically conductive connector and a plurality

electrode structures each extending through the insulating sheet in the thickness-wise direction thereof and arranged in accordance with a pattern corresponding to a pattern of electrodes to be inspected.

[9] A wafer inspection apparatus for conducting electrical inspection of a great number of integrated circuits formed on a wafer, which comprises the probe device according to any one of claims 1 to 8.

[10] A wafer inspection method comprising relatively displacing a circuit board for inspection or a circuit board for connection by location-varying mechanisms making up a parallelism adjusting mechanism to temporarily fix the three parties of the circuit board for inspection, an anisotropically conductive connector and the circuit board for connection in a state that the anisotropically conductive connector has been pinched by the circuit board for inspection and the circuit board for connection, thereby electrically connecting inspection electrodes in the circuit board for inspection to their corresponding terminal electrodes in the circuit board for connection through conductive parts for connection in the anisotropically conductive connector, further pressurizing a probe device from this state to measure a parallelism of the circuit board for

inspection to a wafer and a parallelism of the circuit board for connection to the wafer in a state that a contact member in a probe card is brought into contact with the wafer that is an object of inspection, setting a correction quantity of the quantity of displacement by the location-varying mechanism on the basis of results obtained, conducting an inspection initial state-setting operation for adjusting the quantity of displacement on the basis of the correction quantity, thereby adjusting a parallelism of the circuit board for inspection to the wafer and a parallelism of the circuit board for connection to the wafer, and bringing the whole probe device into contact with the wafer in a state that displacement of the circuit board for inspection or the circuit board for connection in a direction that a clearance between the circuit board for inspection and the circuit board for connection becomes great has been prohibited, thereby conducting electrical inspection.

[11] The wafer inspection method according to claim 10, wherein the parallelism adjusting mechanism is equipped with a plurality of location-varying mechanisms, electric resistance values of the respective conductive parts for connection in the anisotropically conductive connector are measured in a state that the contact member in the probe card is

brought into contact with the wafer, and the correction quantity of the quantity of displacement by the respective location-varying mechanisms is set in such a manner that the distribution of the resultant electric resistance values becomes an even state.

[12] The wafer inspection method according to claim 10 or 11, wherein the inspection initial state is set in such manner that the respective electrical resistance values of the conductive parts for connection in the anisotropically conductive connector are at most 0.1 Ω, and a load per one conductive part for connection in the anisotropically conductive connector is 0.01 to 0.4 N.